5

10

ABSTRACT

A method for implanting ions into a workpiece, such as a semiconductor wafer, includes the steps of generating an ion beam, measuring an angle of non-parallelism of the ion beam, tilting the wafer at a first angle, performing a first implant at the first angle, tilting the wafer at a second angle, and performing a second implant at the second angle. The first and second angles are opposite in sign with respect to a reference direction and in magnitude are equal to or greater than the measured angle of non-parallelism. Preferably, the first and second implants are controlled to provide substantially equal ion doses in the workpiece.